

DRAWER TYPE DOOR OPENING/CLOSING STRUCTURE OF REFRIGERATOR

BACKGROUND OF THE INVENTION

5 1. Field of the invention

The present invention relates to a refrigerator, and more particularly to a drawer type door opening/closing structure of a refrigerator, in which a portion for storing an object can be drawn out from or pushed into a refrigerator body.

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2. Description of the Prior Art

FIG. 1 illustrates a drawer type door opening/closing structure of a refrigerator according to the prior art. As shown, the conventional drawer type door 4 is disposed at a front surface of a refrigerator body 2 to selectively close or
15 open a space inside of the door 4. A tray 6 for storing an object therein, which has an open top, is fixed to a rear surface of the door 4. Movable rails 8 are provided on side surfaces of the tray 6 and extend long along the tray 6
20 backward from the rear surface of the door 4 to guide movement of the tray 6. The movable rails 8 are movably supported by guide rails (not shown) fixed to inner surfaces of side walls of the refrigerator body 2.

When the door 4 having the construction described above is
25 drawn out, the tray 6 moves out of the refrigerator body 2

together with the door 4. Then, the tray 6 emerges out of the refrigerator body 2 so that a user can put an object on the tray 6 or pick a stored object out of the tray 6.

When the door 4 having been drawn out of the refrigerator
5 body 2 is pushed into the refrigerator body 2, the tray 6 comes into the refrigerator body 2 while the movable rails 8 are guided along the guide rails. When the tray 6 has been completely inserted in the refrigerator body 2, the door 4 comes into tight contact with the front surface of the
10 refrigerator body 2 to prevent the cooling air in the refrigerator body 2 from leaking.

However, the conventional drawer type door of a refrigerator as described above has problems as follows.

First, in order to put or take an object into or out of
15 the refrigerator having the drawer type door 4 as described above, it is inevitable that the door 4 should be drawn out forward so that the tray 6 is exposed. That is, since the tray 6 is opened as much as the distance by which the door 4 has moved out of the refrigerator body 2, the door 4 must be
20 drawn out of the refrigerator body 2 as much as possible in order to facilitate placing or removing of an object. However, when the tray 6 is completely exposed out of the refrigerator body 2, too much cooling air may leak out of the refrigerator body 2.

25 Further, when the tray 6 contains many objects or a heavy

object and is thus heavy, it may be difficult to move the tray 6 by drawing or pushing the door 4.

SUMMARY OF THE INVENTION

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Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is to provide a drawer type door opening/closing structure of a refrigerator, which can minimize movement of the door while an object can be easily put into or removed from the refrigerator.

It is another object of the present invention to provide a drawer type door opening/closing structure of a refrigerator, which can be opened or closed more completely.

15 It is another object of the present invention to provide a drawer type door opening/closing structure of a refrigerator, which can be safely operated to prevent an accident while the door is opened or closed.

In order to accomplish this object, there is provided a drawer type door opening/closing structure of a refrigerator, the structure comprising: a refrigerator body having a storage space formed therein; a door for selectively opening and closing the storage space in the refrigerator body, the door being drawn out and pushed into the refrigerator body in a manner in which a drawer is moved, the door being capable of

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being pivoted about a lower end of the door; at least one support frame hingedly connected to a rear surface of the door to allow the door to pivot about the lower end of the door and allow a storage box for storing an object to be seated behind the door; at least one movable rail formed on the support frame; at least one guide rail formed on an inner surface of a side wall of the refrigerator body to be engaged with the movable rail and guide movement of the support frame; and at least one cover bracket protruding backward from the rear surface of the door to cover a gap between the support frame and the rear surface of the door.

The cover bracket is located outside of the support frame when the door stands upright. The door includes a door basket for storing an object, the door basket being disposed at an upper portion of the rear surface of the door. The door further includes at least one tilting latch formed at one side of the rear surface of the door, the tilting latch having a lower end hingedly assembled with the support frame, the tilting latch having a latch jaw and the support frame having a stopper pin, wherein the latch jaw and the stopper pin can be engaged with each other to limit a range within which the door can be pivoted.

In accordance with another object of the present invention, there is provided a drawer type door opening/closing structure of a refrigerator, the structure comprising: a

refrigerator body having at least one storage space formed therein; a door for selectively opening and closing said at least one storage space in the refrigerator body, the door being drawn out and pushed into the refrigerator body in a manner in which a drawer is moved, the door being capable of being pivoted about a lower end of the door; at least one support frame hingedly connected to a rear surface of the door to allow the door to pivot about the lower end of the door and allow a storage box for storing an object to be seated behind the door; and at least one cover bracket protruding backward from the rear surface of the door to cover a gap between the support frame and the rear surface of the door.

The structure may further comprise: at least one movable rail formed on the support frame; and at least one guide rail formed on an inner surface of a side wall of the refrigerator body, wherein the guide rail is engaged with the movable rail and guide movement of the support frame. The cover bracket is located outside of the support frame when the door stands upright. The door includes a door basket for storing an object, the door basket being disposed at an upper portion of the rear surface of the door. The door further includes at least one tilting latch formed at one side of the rear surface of the door, the tilting latch having a lower end hingedly assembled with the support frame, the tilting latch having a latch jaw and the support frame having a stopper pin, wherein

the latch jaw and the stopper pin can be engaged with each other to limit a range within which the door can be pivoted.

A drawer type door opening/closing structure of a refrigerator according to the present invention can be tilted
5 forward to a predetermined angle about its lower end. Therefore, the refrigerator can have a wider opening for receiving an object, which facilitate input or taking out of an object. Further, the cover brackets reduces the possibility of accident and prevents the refrigerator from being broken.

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BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will be more apparent from the following
15 detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view showing a drawer type door opening/closing structure of a refrigerator according to the prior art;

20 FIG. 2 is a perspective view of a refrigerator employing a drawer type door opening/closing structure according to a preferred embodiment of the present invention;

FIG. 3 is a side view of a portion of a drawer type door opening/closing structure according to a preferred embodiment
25 of the present invention; and

FIG. 4 is a top plan view of several elements, including cover brackets, of a drawer type door opening/closing structure according to a preferred embodiment of the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, a drawer type door opening/closing structure of a refrigerator according to a preferred embodiment of the present invention will be described with reference to the accompanying drawings.

As shown in the drawings, a refrigerator body 50 has a refrigerating compartment 52 and a freezing compartment 54, which are formed therein to form separate storage spaces, respectively. The refrigerating compartment 52 is located at a relatively upper portion of the refrigerator body 50, and the freezing compartment 54 is located at a relatively lower portion of the refrigerator body 50 under the refrigerating compartment 52. A vegetable compartment 56 may be separately formed at a proper portion of the refrigerating compartment 52.

The refrigerating compartment 52 contains a plurality of shelves 61, each of which has a shape of a cantilever plate to load and store an object thereon. The shelves 61 are assembled with and held by the shelf holders 63 provided at inner surfaces of the refrigerating compartment 52 and extending in a vertical direction of the refrigerating compartment 52. A

proper number of shelves 61 according to the size of the refrigerating compartment 52 are vertically spaced predetermined intervals apart from each other to compartment the refrigerating compartment 52 into a proper number of storage
5 compartment.

The refrigerating compartment 52 may further include a snack pan 65 for storing fish, snack, and the like, and a can shelf 67 for storing a beverage can thereon, which are located under one of the shelves 61. Also, the refrigerating
10 compartment 52 may include an egg box 69 for storing an egg, which is located under one of the shelves 61.

A control panel 71 for controlling the operation of the refrigerator is disposed at the ceiling of the refrigerating compartment 52, and a lamp 73 is disposed at and exposed out of
15 a lower surface of the control panel 71. When a refrigerating compartment door 86, which will be described below, is opened, the lamp 73 is turned on to light the interior of the refrigerating compartment 52. When the refrigerating compartment door 86 is closed, the lamp 73 is turned off. A
20 cooling air port 75 is formed at an upper portion of an inner surface of a wall of the refrigerating compartment 52 to allow cool air to be exhausted into the refrigerating compartment 52 through the cooling air port 75.

The vegetable compartment 56 is arranged at a lowermost
25 portion of the refrigerating compartment 52 to form a space in

which a vegetable box 80 for storing fruits or vegetables can be seated. A vegetable box cover 82 is disposed above the vegetable box 80 to shield a top surface of the vegetable box 80. The vegetable box cover 82 may contain a magic crisper for
5 restraining evaporation of moisture of an object stored in the vegetable box 80. The vegetable box cover 82 has a vegetable box door 96 formed at a distal end of the vegetable box cover 82, which is described later.

A freezing compartment door 84 and the refrigerating
10 compartment door 86, which enable the refrigerating compartment 52 and the refrigerating compartment 52 to be selectively opened and closed, respectively, are provided at front surfaces of the freezing compartment 54 and the refrigerating compartment 52, respectively, which together constitute the
15 front surface of the refrigerator body 50.

The refrigerating compartment door 86 has one side connected to a right or left side of the front surface of the refrigerator body 50 by means of a hinge (not shown), so that the other side of the refrigerating compartment door 86 can be
20 pivoted forward to open the refrigerating compartment 52. A first door grip 86' is provided at a portion of the front surface of the refrigerating compartment door 86, which is located adjacent to the other side of the refrigerating compartment door 86 opposite to the side where the hinge is
25 located. The refrigerating compartment door 86 further

includes a first door basket 88 for storing an object, which is formed at a rear surface of the refrigerating compartment door 86.

The freezing compartment door 84 is disposed at the front surface the freezing compartment 54 under the refrigerating compartment 52. In order to open the freezing compartment 54, the freezing compartment door 84 may be either linearly moved forward from the front surface of the refrigerator body 50 or pivoted forward a predetermined angle about a hinge located at a lower end of the refrigerator body 50. Reference numeral 84' not described above designates a grip of the freezing compartment 54.

The freezing compartment 54 has a storage box 90 for seating an object therein. The storage box 90 is assembled with a rear surface of the freezing compartment door 84, so that the storage box 90 moves in company with the freezing compartment door 84 when the freezing compartment door 84 is moved.

An upper portion of the freezing compartment 54 is partitioned into a left section and a right section, in which an ice maker 92 and a storage basket 94 are seated, respectively. The storage basket 94 may be formed of wires. Of course, the portion in which the ice maker 92 and the storage basket 94 are located is sufficiently high enough to prevent the ice maker 92 or the storage basket 94 from coming

into contact with the storage box 90.

The freezing compartment door 84 is of a drawer type door, which is opened when it is drawn out forward. Specifically, the freezing compartment door 84 has a construction which
5 enables the freezing compartment door 84 to rotate forward about its lower end until the freezing compartment door 84 is tilted forward at a predetermined angle. Therefore, as shown in FIG. 3, the storage space in the freezing compartment 54 can be opened by simply tilting the freezing compartment door 84
10 without drawing the freezing compartment door 84 forward of the refrigerator body 50. Further, the freezing compartment door 84 is supported by a separate elastic member (not shown) so that the freezing compartment door 84 can be restored to its original state (the state in which the freezing compartment
15 door 84 stands upright, from among the states shown in the figures) when the force pulling the freezing compartment door 84 open is eliminated.

A pair of tilting latches 102 are connected to the rear surface of the freezing compartment door 84. The tilting
20 latches 102 extend backward from opposite sides of the rear surface of the freezing compartment door 84. Each of the tilting latches 102 has a latch jaw 102a formed at an upper rear end of the tilting latch 102 and a lower hinge pin 102b formed at a lower end of the tilting latch 102.

25 A pair of support frames 104 are connected to the rear

surface of the freezing compartment door 84. Each of the support frames 104 has one side connected to the freezing compartment door 84 and the other side movably supported in the freezing compartment 54. In other words, the freezing compartment door 84 is actually installed at the support frames 104. It is preferred that each of the support frames 104 has a shape of an inverted "L", including a horizontal section 104a and a vertical section 104b, as shown in FIG. 3. The storage box 90 is located between and supported by the support frames 104 constructed as described above.

The support frame 104 has a lower hinge hole 106 formed through a portion adjacent to a lower end of the vertical section 104b. The lower hinge pins 102b are rotatably inserted through the lower hinge holes 106, respectively, so that the freezing compartment door 84 can rotate about the lower hinge pins 102b.

Further, a stopper pin 108 protrudes inward from the vertical section 104b of the support frame 104. When the latch jaw 102a has rotated a predetermined angle, 103 catches or engages with the latch jaw 102a, thereby limiting the range of angle to which the freezing compartment door 84 can be pivoted open.

Of course, the latch jaw 102a may be directly caught by or directly engage with an end portion of the vertical section 104b of the support frame 104, without separately forming the

stopper pin 108 at the support frame 104.

Cover brackets 109 protrude backward from a lowermost portion of the rear surface of the freezing compartment door 84. Each of the cover brackets 109 prevents foreign material
5 from being introduced from a side of the freezing compartment 54 into a gap between the vertical section 104b of the support frame 104 and the freezing compartment door 84 when the freezing compartment door 84 is restored to its upright position from its forward tilted position. It is preferred
10 that the cover bracket 109 has a substantially rectangular shape. Of course, the cover bracket 109 may have various other shapes such as a fan shape, an inverted triangular shape, etc.

The cover brackets 109 protrude backward from opposite side portions of the lowermost portion of the rear surface of
15 the freezing compartment door 84, specifically, they are formed outside of the support frames 104. Therefore, when the freezing compartment door 84 stands upright, the cover brackets 109 are located outside of the vertical section 104b of the support frame 104.

20 That is, as shown in detail in FIG. 4, when the freezing compartment door 84 stands upright, the left-side cover bracket 109 is located on the left of the vertical section 104b of the left-side support frame 104, and the right-side cover bracket 109' is located on the right of 104bk of the right-side support
25 frame 104'.

A movable rail 110 is formed on an upper portion of an outer surface of each of the support frames 104. In other words, a pair of movable rails 110 are formed on outer surfaces of the pair of support frames 104, respectively. When the
5 freezing compartment door 84 is drawn out, the movable rails 110 slide forward to enable the storage box 90 to move forward along with the freezing compartment door 84. The movable rail 110 may be integrally formed with the support frame 104 formed of a metal steel plate.

10 Guide rails 112 are formed on inner surfaces of side walls of the freezing compartment 54 to slidably support the movable rails 110, respectively. The movable rail 110 is supported by and can slide along the guide rail 112.

A second door basket 114 is assembled with an upper
15 portion of the rear surface of the freezing compartment door 84 to store an object on the rear surface of the freezing compartment door 84. The second door basket 114 can be easily exposed and accessed only by tilting the freezing compartment door 84. Therefore, an object can be easily stored in or taken
20 out of the second door basket 114.

Hereinafter, an operation of a drawer type door opening/closing structure of a refrigerator according to the present invention, having the construction as described above, will be described in detail.

25 When a user pulls the second door grip 84' of the freezing

compartment door 84 forward and downward in order to store or take out an object, the freezing compartment door 84 rotates forward and downward about the lower hinge pin 102b, that is, about the lower end of the freezing compartment door 84. Here, 5 the rotation of the freezing compartment door 84 stops when the latch jaw 102a of the tilting latch 102 is caught by or engages with the stopper pin 108 of the support frame 104.

When the freezing compartment door 84 has rotated a predetermined angle counterclockwise in FIG. 3 together with 10 the tilting latch 102, the second door basket 114 provided at the rear surface of the freezing compartment door 84 becomes exposed so that an object can be put into or taken out of the second door basket 114.

Further, in the state in which the freezing compartment 15 door 84 is tilted as described above, when the freezing compartment door 84 is pulled forward, the support frames 104 connected to the rear surface of the freezing compartment door 84 are drawn out together with the freezing compartment door 84, so that the storage box 90 is exposed. When the storage 20 box 90 is exposed as described above, a user can put an object into or take an object out of the storage box 90.

Here, the movable rails 110 formed on the support frames 104 slide forward along the guide rails 112, so that the support frames 104 can smoothly move forward.

25 Next, the sequence in which the storage box 90 and the

second door basket 114 having been drawn out of the freezing compartment 54 are inserted back into the freezing compartment 54 will be described hereinafter.

When a user pushes the freezing compartment door 84 toward
5 the freezing compartment 54, the tilting latch 102 attached to the rear surface of the freezing compartment door 84 rotates about the lower hinge pin 102b. This rotation stops when the rear surface of the freezing compartment door 84 comes into close contact with the vertical sections 104b of the support
10 frames 104. When the tilting latch 102 rotates as described above, the second door basket 114 and the freezing compartment door 84 connected to the tilting latch 102 also rotate clockwise in FIG. 3 until the freezing compartment door 84 stands upright.

15 Here, the cover bracket 109 prevents a portion of a human body, such as a finger, or other foreign material from being caught between the freezing compartment door 84 and the vertical sections 104b of the support frames 104.

That is, when the freezing compartment door 84 is tilted
20 forward, the gap as designated by 'A' in FIG. 3 forms a space shaped like an inverted triangle in a side view between the vertical sections 104b of the support frames 104 and the freezing compartment door 84. However, the cover bracket 109 covers the space, thereby preventing foreign material from
25 coming into the space or gap between the rear surface of the

freezing compartment door 84 and the vertical sections 104b of the support frames 104.

Further, when the user goes on pushing the freezing compartment door 84 into the freezing compartment 54, the
5 movable rails 110 of the support frames 104 slide along the guide rails 112 into the freezing compartment 54. It goes without saying that, at this time, the storage box 90 also moves into the freezing compartment 54.

Meanwhile, the present invention allows a user to pull out
10 the storage box 90 without pivoting the freezing compartment door 84. For this operation, the user can pull the freezing compartment door 84 forward or forward and upward. Then, the freezing compartment door 84 is drawn out while standing upright without being pivoted, so that the storage box 90 and
15 the second door basket 114 are drawn all together out of the refrigerator.

Although the above description is given of a case in which the present invention is applied to a drawer type door for a refrigerating compartment, it goes without saying that the
20 present invention can be applied to a drawer type door for a freezing compartment.

As described above in detail, a drawer type door opening/closing structure of a refrigerator according to the present invention enables the door to be tilted forward up to a
25 predetermined angle, and the door has cover brackets provided

at side portions of the rear surface of the door to prevent alien material from being introduced from the side portions.

By a drawer type door opening/closing structure of a refrigerator according to the present invention, a user either
5 can put an object into or take an object out of a door basket by tilting only the door without drawing the door forward out of the refrigerator, or can draw the door out of the refrigerator without tilting the door. Therefore, the user can open or close the door in a wider variety of ways, and the
10 refrigerator can have a wider opening for receiving an object, which facilitate input or taking out of an object.

Further, the cover brackets provided at side portions of the rear surface of the door prevent alien material, including human fingers, from being introduced from the side portions
15 into the gap between the door and the support frame. Therefore, the present invention reduces the possibility of accident in which a portion of a human body is caught between the door and the support frame and prevents in advance the opening/closing structure of the drawer type door from being
20 broken due to the foreign material.

Moreover, when a foreign material is caught between the door and the support frame, typically the door and the refrigerator body cannot come into close contact with each other, so that cooling air may leak out of the refrigerator.
25 However, the present invention can solve such a problem.

Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.